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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/775,063	02/11/2004	Takashi Sato	Q79869	3316
23373 7590 06/10/2009 SUGHRUE MION, PLLC 2100 PENNSYLVANIA AVENUE, N.W. SUITE 800 WASHINGTON, DC 20037				
EXAMINER				
MILLER, MICHAEL G				
ART UNIT		PAPER NUMBER		
1792				
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/775,063

Applicant(s)

SATO ET AL.

Examiner

MICHAEL G. MILLER

Art Unit

1792

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 06 May 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-4 and 6-11 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4 and 6-11 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-8508)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

- 1) A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 10 MAR 2009 has been entered.

Response to Amendment

- 2) Examiner notes the amendment filed on 10 MAR 2009. The amendment introduces no new matter and is therefore accepted. As a result of the amendment Claims 1 and 3 are amended.

Response to Arguments

- 3) Applicant's arguments, see remarks, filed 10 MAR 2009, with respect to Claims 1 and 3 and dependent claims therefrom have been fully considered and are persuasive. The rejection of these claims has been withdrawn.
- 4) In summary, Applicant argues that the cited prior art does not teach a cleaning process that consists of separate cleanings with ultra pure water and isopropyl alcohol. Examiner agrees. Applicant also argues that the prior art does not address the nitrogen concentration in the protection layer. Examiner agrees.
- 5) Examiner would like to note the following points in Applicant's arguments:

- a) Applicant argues that there is no teaching that the cleaning process occurs between the nitrogen plasma processing and the lubricant deposition. Examiner points out that there is no claim language which requires this sequence of steps.
- b) Applicant argues that Suzuki is not relevant to the rejection at hand. Examiner respectfully disagrees. Suzuki uses its solvent to remove inspection gas from the system for analysis. This removal constitutes cleaning of the substrate, as foreign matter is removed. Examiner further notes that there is no claim language addressing the required degree of cleaning.

Claim Rejections - 35 USC § 103

- 6) The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:
 - a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.
- 7) The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:
 - (1) Determining the scope and contents of the prior art.
 - (2) Ascertaining the differences between the prior art and the claims at issue.
 - (3) Resolving the level of ordinary skill in the pertinent art.
 - (4) Considering objective evidence present in the application indicating obviousness or nonobviousness.
- 8) This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein

were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

- 9) Claims 1-2 and 6-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sakaguchi et al (U.S. PGPub 2002/0064606, hereinafter '606) in view of Veerasamy et al (U.S. Patent 5,858,477, hereinafter '477), Kato et al (WO 02/11130, hereinafter '130) and Walter (U.S. Patent 6,143,087, hereinafter '087).
- 10) With specific regard to Claim 1, '606 teaches a method of producing a magnetic disk for use in a magnetic disk apparatus of a load / unload system, comprising:
- a) Forming at least a magnetic layer (32) on a disk substrate (S) (Figure 2).
 - b) Thereafter forming a carbon-based protection layer (33) by plasma CVD (paragraphs 0218 - 0220, Figure 1)
 - i) Performed using a mixed gas of a hydrocarbon-based gas and a nitrogen gas without containing an inactive gas (paragraphs 0237 - 0239).
 - ii) Performed under the condition that the disk substrate with the magnetic layer formed thereon is kept at 250°C (paragraphs 0166 - 0168).
 - c) '477 teaches the use of an acetylene - nitrogen system to deposit diamond-like carbon layers using P-CVD over magnetic recording media films (Column 18 Lines 12 - 53 for the acetylene - nitrogen system, Column 11 Lines 20-32 for the

teaching that nitrogen may be continuously fed with the acetylene to nitrogenate the resultant diamond-like carbon film).

- d) Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to have combined the method of '606 with the technique of '477 because '606 wants to deposit a diamond-like carbon layer on a magnetic recording media using P-CVD and '477 teaches a feed gas system for doing so.
- e) '606 discloses gas ratios in paragraphs 0237-0239 which include the claimed ratio of nitrogen gas to hydrocarbon gas. It would have been obvious to a person having ordinary skill in the art at the time the invention was made to control the nitrogen concentration to obtain a desired durability of the protective layer, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 220 F.2d 454, 105 USPQ 223 (CCPA 1955).
- f) With regard to the use in a load / unload system, Examiner takes the position that:
 - i) The product resulting from the method of '606/'477 fulfills the limitation of Claim 1 because it is capable of being used in a load/unload system. Examiner cites as evidence Morikawa et al (U.S. Patent 6,946,191, hereinafter '191), which teaches in the background that the two major differences between CSS and LUL systems are write-head storage and write-head contact. First, these differences are in the drive mechanism and not

inherent to the magnetic media; second, as the LUL system performs read/write operations by passing over the surface, the topography of the surface is less critical, i.e. while a smoother surface is preferable is it not required as long as the topography does not bring the head into contact with the disk. (Column 1 Line 1 – Column 2 Line 17).

- g) '606/'477 do not fairly teach a cleaning step for the carbon-based film.
- i) '130 teaches a system for preparing magnetic media which teaches immersing the magnetic media in a solvent material to remove deposits from the surface. This teaching is generally disclosed in Pages 11 - 17; the specific portion of this citation addressing the solvent is Page 17, where it is taught that the solvent may comprise IPA and water. At Page 11 it is taught that this immersion removes deposits from the surface of the magnetic media, which is a cleaning operation which improves the quality of the magnetic media.
- ii) Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to have combined the method of '606/'477 and '130 as '606/'477 wants to produce a magnetic medium with a protective carbon film and '130 teaches that immersing the magnetic medium in a solution comprising IPA and water can remove deposits from the surface and improve the quality of the media.

- iii) Examiner notes that Applicant does not define 'ultra pure water' and asserts that it would have been common sense to use pure water in a cleaning operation.
 - h) '606/477/130 do not teach that the cleaning in ultra pure water and the cleaning in IPA are separate steps.
 - i) '087 teaches a method for cleaning the magnetic media portion of a disk drive which entails rinsing the surface with deionized water and then flooding the chamber with IPA vapor to remove the water and other organic materials (Column 12 Lines 1-29 and 40-47).
 - ii) Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to have combined the teachings of '606/477/130 and '087, since both methods want to clean the surface of magnetic media using IPA and pure water and '087 teaches that it is known to perform these steps distinctly from each other.
- 11) With specific regard to Claim 2, which contains all the limitations of Claim 1 as listed above, '606/477/130 teaches the method of Claim 1 wherein:
- a) The mixed gas is a mixture of a low-molecular weight straight-chain hydrocarbon-based gas ('606 paragraph 0094 for definition of low-molecular-weight, paragraph 0237 for description of mixture, paragraph 0238 for listing of allowable hydrocarbons which include Applicant's selection) and a nitrogen gas ('606 paragraph 0237).

12) With specific regard to Claim 6, which contains all the limitations of Claim 1 as listed above, '606/477/130 is silent as to the specific Raman spectroscopy properties of the deposited film. However:

- a) The Raman spectroscopy results are dependent on the chemical composition of the material being analyzed.
- b) Applicant's claimed method produces acceptable Raman spectroscopy results.
- c) '606/477/130 teaches a method which deposits a film under the same conditions as claimed by Applicant.
- d) Therefore, Examiner has a reasonable expectation that a film deposited by the method of '606/477/130 in accordance with the parameters of Applicant must necessarily produce a film with the same Raman spectroscopy properties as those of Applicant. When a reference discloses the limitations of a claim except for a property, and the Examiner cannot determine if the reference inherently possesses that property (in this case, the B/A ratio of the Raman spectrum), the burden is shifted to Applicant(s). *In re Fitzgerald*, USPQ 594 and MPEP §2112.

13) With specific regard to Claim 7, which contains all the limitations of Claim 2, '606/477/130 teaches the method of Claim 2 wherein:

- a) The low-molecular-weight straight-chain hydrocarbon-based gas is acetylene ('477 Column 18 Lines 12 - 53 for the acetylene - nitrogen system).

14) With specific regard to Claim 8, Examiner takes the position that in a nitrogen plasma system, charged nitrogen ions or free nitrogen radicals will inherently interact with some portions of hydrocarbons to form carbon-nitrogen bonds which will be

incorporated into the protective film. Meanwhile, some other portions of the hydrocarbons will not interact with the nitrogen and will be bonded into the protective layer as hydrocarbons.

- 15) With specific regard to Claim 9, '130 teaches that it is desirable to keep the carbon film thickness below 5 nm (Page 26 lines 15-19).
- 16) With specific regard to Claim 10, '606/'477/'130 teaches the invention as claimed except for the thickness of the disk substrate. It is well known in the art of magnetic media that the thickness of the disk substrate determines the types of drives the disk can be used in, as the drive bays are of set heights; therefore, the thickness of the substrate is a result-effective variable with regards to the end use of the produced disk. It would have been obvious to a person having ordinary skill in the art at the time the invention was made to select an appropriate disk thickness for the end use of the magnetic media, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).
- 17) With specific regard to Claim 11, '606/'477/'130 teaches the invention as claimed except for a specific Rmax value. '130 discusses an Ra value, mean surface roughness, which is a comparable measurement to Rmax (maximum surface roughness). At Pages 28 and 29, '130 teaches that a low Ra value allows for a more efficient magnetic storage device, as spacing loss is minimized as the magnetic head comes closer to the disk. Therefore, Ra and by extension Rmax are result-effective variables with regards to the write capacity of the magnetic medium (as

Rmax decreases, the distance between write head and the lowest points of the medium decrease and distance between adjacent write tracks decreases, allowing for higher capacity). It would have been obvious to a person having ordinary skill in the art at the time the invention was made to select an appropriate disk roughness for the end use of the magnetic media, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

- 18) Claims 3-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over '606/'477/'130/'087 in view of Suzuki et al (U.S. Patent 6,680,112, hereinafter '112).
- 19) With specific regard to Claim 3, which contains all the limitations of Claim 1, '606/'477/'130/'087 teaches the method of Claim 1 in its entirety.
- a) '606/'477/'130/'087 also teaches a lubricating film wherein the upper surface of said film reduces surface friction ('606 Paragraphs 0513-0517).
- b) '606/'477/'130/'087 does not teach the following limitations of Claim 3:
- i) exposing the carbon-based protective layer to nitrogen plasma after forming the carbon-based protection layer so that the concentration of nitrogen with respect to carbon is approximately 8.5 at%
- c) '112 teaches that using an etching gas, wherein nitrogen is explicitly cited as a valid example among other gases that can generate a plasma (Column 5 Lines 16-29), allows for controlling the affinity of the DLC film to a lubricant film (Column 4 Lines 21-45, 50-56), promoting adhesion of the lubricant film to the

- DLC film. '112 further teaches that a desirable concentration of nitrogen in the DLC film is between 5.0 - 9.4% by atomic count (Column 7 Lines 61-64)
- d) Examiner takes the position that the invention of Claim 3 is suitable for use in a CSS system. The selection of something based on its known suitability for its intended use has been held to support a prima facie case of obviousness. *Sinclair & Carroll Co. v. Interchemical Corp.*, U.S. 327, 65 USPQ 297 (1945).
- e) Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have applied the plasma-etching step of '112 to the selected method of '606 because '606 teaches a lubricating film, '112 teaches a method to improve the affinity between the lubricating film and the DLC film, and the selection of something based on its known suitability for its intended use has been held to support a prima facie case of obviousness.
- 20) With specific regard to Claim 4, which contains all the limitations of Claim 3 as listed above, '606/'477/'130/'087/'112 teach all the limitations of Claims 1 and 3.
- a) '606/'477/'130/'087/'112 further teaches forming a lubrication layer after exposing the carbon-based protection layer to nitrogen plasma ('606 paragraph 0247).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MICHAEL G. MILLER whose telephone number is (571)270-1861. The examiner can normally be reached on M-F 7-4.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Cleveland can be reached on (571) 272-1418. The fax phone

number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Michael G. Miller/
Examiner, Art Unit 1792

/Michael Cleveland/
Supervisory Patent Examiner, Art Unit 1792